

THE FARM BOOK





We Hope You'll Like It!

THIS is the best way we know to thank you for your interest
in **THE  FARM BOOK.**

We have attempted to present this great subject—electricity on the farm—in a practical way. It has been our aim to include only information which will be of value to you. In short, this book has been written for you. *We hope you'll like it!*

Sincerely yours,

GENERAL ELECTRIC COMPANY

Electric in the House

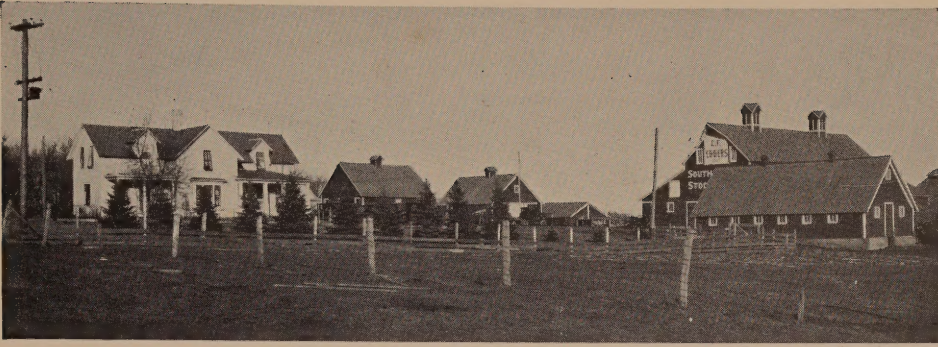
The G-E FARM BOOK



GENERAL ELECTRIC

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Electricity is supplied to this South Dakota farm through the transformer at the extreme left

Introduction

What can electricity do for the farmer?

It lights cities, performs the heavy labor in mills, works and ministers comfort in homes, and adds to the prosperity of the nation.

The farmer, however, is interested in the things electricity can do for him and, in general, the problems of adapting it to agricultural work. He is willing to leave the theory of electricity to engineers who spend their lives investigating it.

Sources of Electricity

There are several sources from which the farmer may obtain electricity.

The electric light, heat and power company which generates a great volume of electricity and supplies it through transmission lines to large and small consumers, is the most reliable source. Ultimately a majority of American farms may be supplied in this way. Today electric light, heat and power company service is used by about 300,000 farms.

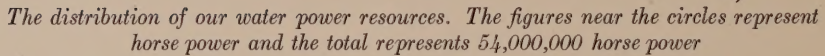
The individual generating plant driven by a gasoline engine located on the farm is a second source. These machines are generally known as farm light and power plants. Thousands of them are now in satisfactory operation on farms. They are of value particularly to isolated farms to which electric light, heat and power company lines cannot be extended economically.

A few wind electric plants are in operation where conditions are favorable.

Small individual water power plants are being used successfully by farmers having swift streams crossing their land, but the special conditions necessary and the high initial expense make them impracticable for the average farmer.

The Electric Light, Heat and Power Company

Electric light, heat and power companies produce electricity either by steam, requiring coal and water, or by water power requiring special water conditions. It is often necessary for a water power plant to have an auxiliary coal burning plant known as a "steam standby" to produce current when the water power fails.



THE PRODUCTION OF ELECTRICITY BY WATER POWER

Water power has its limitations in producing a supply of electricity. The high cost of transmission lines and the loss in electric energy in transporting the current make it too expensive to be used profitably if it must be carried several hundred miles to the place where it is to be used.

A survey of the United States shows that slightly over half of the maximum potential water power is in the states of California, Oregon, Washington, and Montana. Over 73 per cent, or nearly three-quarters of all the potential water power in the United States, lies *west* of a line extending from the middle of Dakota southward through the middle of Texas. Our great farm demands for power are *east* of that line where approximately only one-quarter of our water power resources are located. They are already much more highly developed in proportion to the power available than are the three times larger resources of the West.

The Federal Water Power Act which went into effect in June, 1920, established a well defined national policy for the development of natural water power resources. Under its provisions, all water power development is controlled and regulated by the Federal Power Commission.

THE RELATION OF STEAM PLANTS TO COAL MINES

The location of steam plants at the mouth of coal mines, which is often suggested as a means of producing inexpensive power, is generally impossible. In a steam plant, from 400 to 800 tons of water are required for each ton of coal burned. The water is used to condense the steam after it has delivered its energy to the turbine. As a result, it is usually cheaper to haul coal than to develop a water supply at the mines. Steam plants near the consumer and convenient to a plentiful water supply are actually an economy.

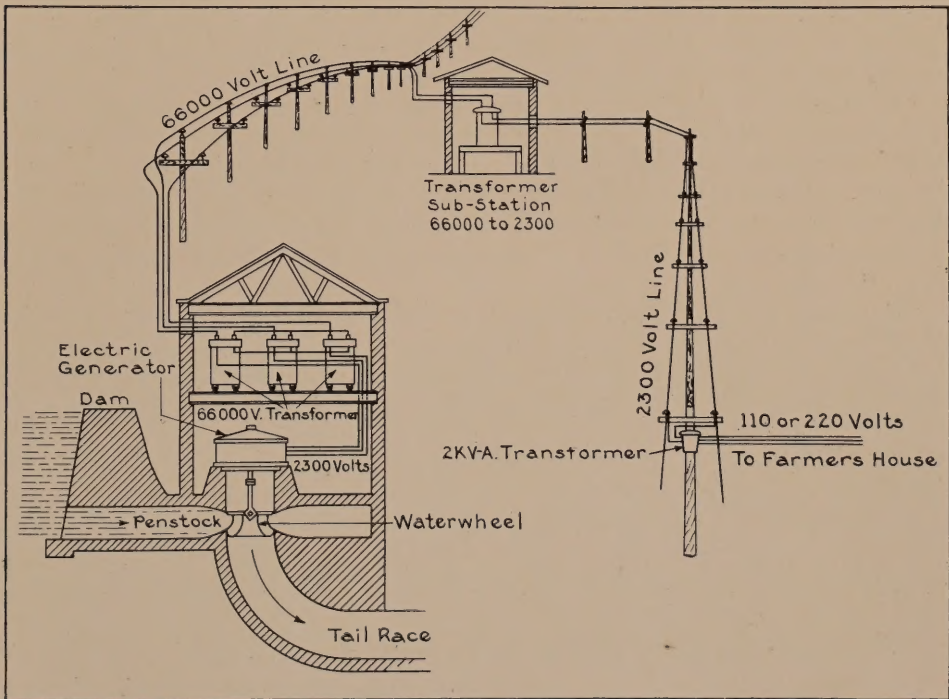
The efficiency of steam plants has increased five-fold in the last twenty years.

From this brief review of the facts it will be readily seen that the real basis for electrical development is a combination of steam and water power.

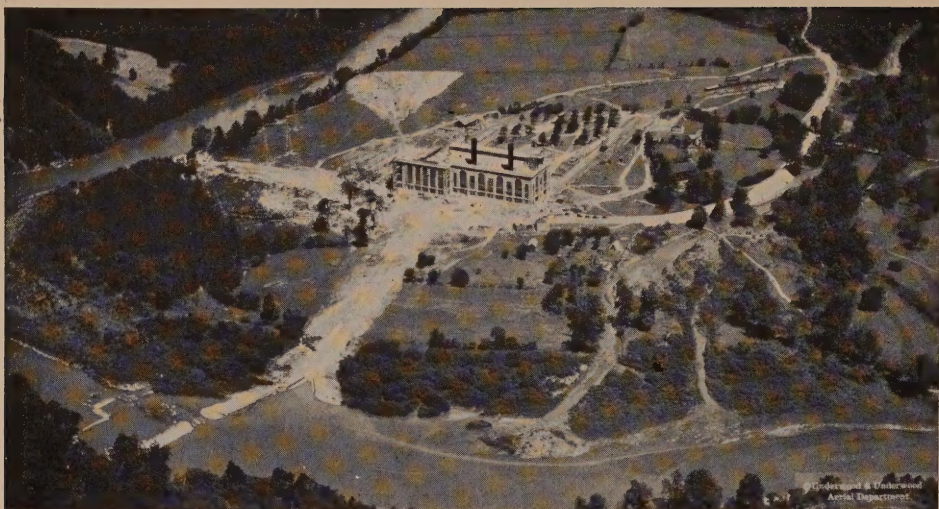
THE DISTRIBUTION OF ELECTRICITY

The problem of distributing electricity economically in farming districts is the greatest obstacle in the path of farm electrification. Because the pressure or voltage of electricity decreases in proportion to the distance it is transmitted, power of low voltage cannot be economically distributed over long distances. Electric light, heat and power companies overcome this by producing power of high voltage. This high voltage power is distributed through the lines, and where it is to be used in a home it must first pass through a transformer which reduces it to the low voltage necessary for lamps and appliances. Transformers are expensive because they use a certain amount of power whether any is taken from them or not, and because of the general care they require.

In a city, where houses are close together, from ten to twenty homes may obtain current through the same transformer and the expense is divided into small sums. In the country, farms are usually so separated that one transformer is required for each farm, which necessarily increases the cost of electricity to each farmer. Where a high tension line crosses a farmer's property an even more expensive transformer is required to reduce the power to a voltage suitable for his use. The cost of this transformer and the difficulties involved may make the price of the service prohibitive in certain cases.



This shows how electricity generated in a water-power plant is sent over a main line at high voltage, reduced to a lower voltage for branch farm lines, and finally reduced to the voltage needed on the farm



Steam Plant near a plentiful water supply, which produces electricity for use in the surrounding territory

SURVEYS ARE BEING MADE

The important national agricultural organizations, state universities, and the electrical industry are now co-operating in establishing and studying experimental electrified rural districts, to determine the extent to which the farmer can profitably apply electric service. One of these districts has been fully equipped and is in operation in Minnesota. Co-operative studies are also being undertaken in other states. The Pacific Coast states, Iowa, Kansas, Wisconsin, Ohio, Alabama, and New England are among the sections interested in intensive investigations of the possibilities of electricity.

Authoritative and accurate information is available to farmers interested in electricity from the organizations engaged in the investigations. Chief among these is the Committee on the Relation of Electricity to Agriculture, 1116 Garland Building, Chicago, Ill., which is composed of a representative or representatives from each of the following organizations:

American Farm Bureau Federation, 58 East Washington Street, Chicago, Ill.

National Electric Light Association, 29 West 39th St., New York City

Power Farming Association, Monadnock Building, Chicago, Ill.

American Society of Agricultural Engineers, Mount Clemens, Michigan

U. S. Department of Agriculture, Washington, D.C.

U. S. Department of Commerce, Washington, D.C.

U. S. Department of The Interior, Washington, D.C.

Most of the state colleges of agriculture are taking a keen interest in farm electrification and are working closely with other agencies in making state surveys and investigations. Perhaps the best source of information, however, is the nearest electric light, heat and power company, because of its familiarity with local conditions.

CALIFORNIA LEADS IN ELECTRIFIED FARMS

The Pacific Coast States, and particularly the State of California, are farther advanced in farm electrification than any other agricultural section of the United States. There are two reasons for this exceptional progress:

First, the need of power for irrigation in a large part of the farming territory, and second, the many sources available for water power plant development.

In California alone it is estimated that on the ranches there are 35,500 electric motors in operation. These motors total approximately 483,965 horse power. Eighty per cent of them are used for driving irrigation pumps. With such an unusually large consumption of current, judging by middle western and eastern standards, the electric light, heat and power companies can afford to sell power at a low cost and still make a profit. As a result, there is a general use of electricity for lighting and barn power operations.

In the interior valleys where wood, coal, or oil is not readily available, cooking to a large extent is done by electricity. The favorable climatic conditions of the far West encourage the use of electricity for this purpose and it is estimated that there are 10,000 electric ranges in use on California farms.

PROGRESS IN OTHER STATES

In the State of Iowa, several thousand farmers are using electric current. One electric light, heat and power company operating in some twenty counties has about a hundred farm extension lines serving an average of twenty farmers to the line, or about 2000 customers in all. Furthermore, the number of customers throughout the state is gradually increasing.

There is a 120,000-acre irrigated tract in Southern Idaho where electricity is being applied extensively to farming. The water from the huge Minidoka dam generates 10,000 horse power of electricity. In the summer



Pump House in a California Orchard. Current is supplied to operate the pumps through the three transformers



An Electrified Farm in Minnesota. One of the poles of the Electric Service Line appears in the foreground

the power is used chiefly to operate irrigation pumps. One-half of the power is sold to farmers and small towns, 1100 farmers and six towns being supplied with current for lighting, heating and power work. As in California, however, conditions in this territory are especially favorable for farm electrification.

In Ohio, one electric light, heat and power company has 230 miles of transmission lines which serve forty-six towns and villages. In addition, about 1600 farmers along the right of way are being provided with electricity.

An electrified farm line has been established at Red Wing, Minnesota, for the purpose of making scientific tests to determine the extent to which electricity can be profitably applied to farm work. The farmers on the line; the light, heat and power company; the Minnesota Agricultural College, and the Minnesota Farm Bureau Federation are co-operating in the investigation.

These examples represent two general classifications into which rural electrification projects can be divided. The first group consists of farmers who use a large amount of electricity for irrigating, and the second group is composed of those who are favorably located in relation to the light, heat and power company and are applying electricity extensively to general farm work. In practically every state there are electrified farming districts. Whether or not an electric light, heat and power company can extend its lines depends upon the number of farmers who want the current and the amount they can use.

*S. E. D. Service**After the chores are done radio furnishes the entertainment*

Radio Eliminating Farm Isolation

Farm isolation is a thing of the past. It may be aptly said today that the farmer is as near to town as he is to his radio set.

Talented musicians, actors, and entertainers take part in radio programs and the farmer, figuratively speaking, occupies a front row seat. Prominent educators broadcast instructive talks and the farmer obtains the full benefit of their teaching. Crop, weather, and market reports are announced by radio in his home and he receives authoritative information that is of economic advantage to him. Broadcasting stations are being used to warn him of the spread of stock disease epidemics and insect plagues, so that he can take the necessary precautions to protect his stock or crops. This knowledge, broadcast at a time when the farmer can use it most advantageously, is invaluable and could not be given him so quickly in any other way.

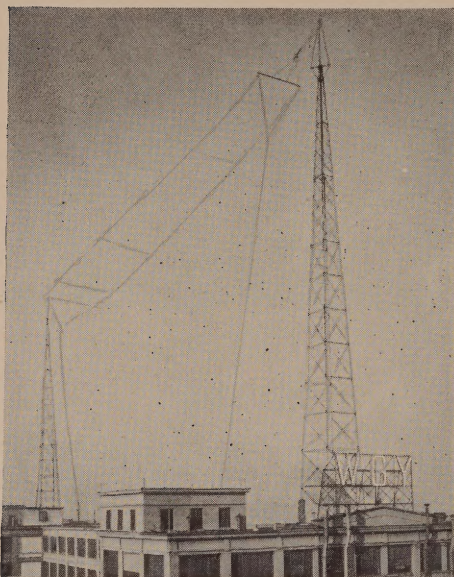
He listens to the sermons of nationally renowned preachers. The great political orators of the world address him in his living room, informing him of national and world affairs. At baseball and other sport contests he occupies the grandstand and follows the progress of the games play by play.

These are a few of the benefits that are brought to the farm fireside by radio. Heavy rains or deep snow can't keep the music in the air from the farmhouse. The drab curtain of isolation, obscuring the activities of the world from hundreds of thousands of out-of-the-way farms, has been lifted forever by radio.

Some stations are planning radio extension courses under the direction of state colleges to explain scientific methods of farming that help to increase crop production. As a result, radio has become far more than a means of entertainment for the farmer. It is a thing of utility.

Two large broadcasting stations are maintained by General Electric Company. WGY is located at Schenectady, New York, and its voice is heard almost nightly, after the day's work, on the farms in the states east of the Mississippi River. KGO, the Sunset Station, is at Oakland, California, and serves the farmers of the West.

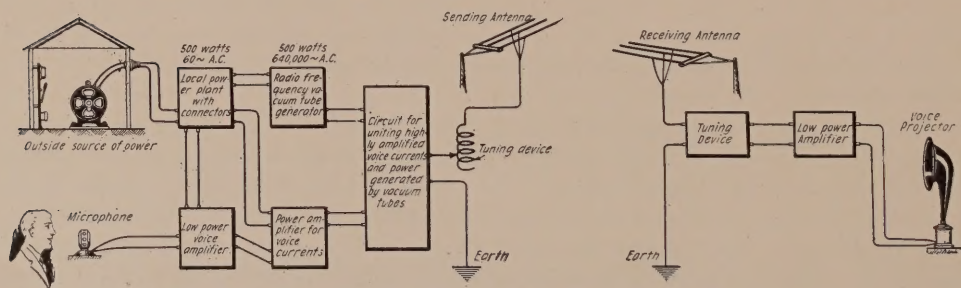
Radio is the child of electricity, but its programs are accessible to every farmer whether he is served with electric current or not. It is the helpful and entertaining contribution of an industry to the life of the American farmer.



Sending antenna of Radio Broadcasting Station WGY at Schenectady, N. Y.



Broadcasting a baseball game, play by play, from the grandstand in a major league ball park



How the voice travels from the broadcasting studio at the left to the headset or voice projector in the farm home at the right. Hundreds of miles often separate the sending and receiving antennae

Electricity in the Home

The value of electricity in the farm home cannot be determined in the same way in which its usefulness in the barn is calculated. It is possible to determine accurately whether it is cheaper to milk cows by hand or by machine. It is more difficult to compute how much can be saved by the use of electric lights and appliances in the home. We know that it is worth a great deal to do away with the drudgery of cleaning and trimming kerosene lamps. There is a real value in ridding the farm of the fire danger of oil lamps, but it cannot be estimated. It is worth an incalculable sum to lighten the burden of the housewife and preserve her health and strength. Poor lights are the cause of headaches and the early use of spectacles. Carrying water taxes the strength of the farmer's wife and heavy washings done by hand injure her health. These and a hundred other disadvantages, handed down from the farm of a past century, can be abolished by electricity, and but a fraction of the true economic worth of the replacement can be written in figures.

A survey, conducted by the U. S. Department of Agriculture in 1919, of about 10,000 representative farm homes in the farming regions of 33 northern and western states revealed that farm women work thirteen hours a day in the summer, and ten and a half in the winter. Seventy-nine per cent of the homes investigated were using kerosene lamps. Forty-two per cent reported power for operating farm machinery, but only fifteen per cent used the power to relieve the woman of some of her household duties. Only thirty-two per cent of the homes had running water. These figures are based on conditions in 1919 and there has undoubtedly been an advance since that time. Nevertheless, the farm woman is still working far harder than necessary. She needs more time to devote to her children and to make her home more comfortable and beautiful. She needs equally as much as her partner, and perhaps even more, the freedom from drudgery that electricity brings.

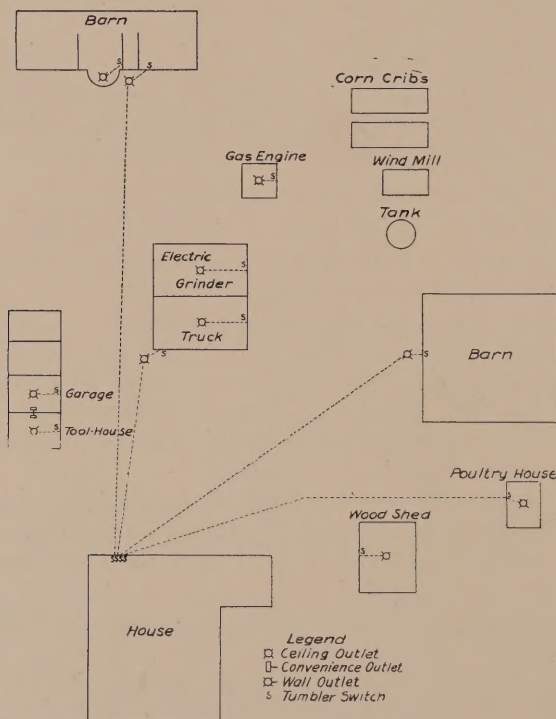
PLANNING THE WIRING

In planning wiring for the farm home, a thought should be given to future requirements. It pays to make the wiring complete in the first place as subsequent changes or additions are more expensive.

If the house is being wired for an individual electric plant producing 32-volt current, National Electrical Code standard wire should be used. The wire must be approximately three times as heavy as that necessary to carry the 110-volt current obtained from an electric light, heat and power company line. The same wiring, however, can be used should 110-volt current later become available.

Wiring should be planned to become a permanent part of a home. Most contractors prefer to use flexible-armored conductor in existing farmhouses because it is easier to install and there is no danger of the insulation wearing or being gnawed by rats or mice.

Wiring devices are an essential part of the installation. They include the switches, convenience outlets, lamp sockets and other like items. The choice of wiring devices is usually left entirely to the qualified contractor who will see that proper materials are used. There is a possibility however, that in trying to make a job less expensive, a contractor will be tempted to lessen the efficiency of the completed wiring.



Above—Diagrams of the electrical wiring in two typical farm houses. Below—Diagram showing buildings wired so that barnyard lights can be controlled from the house

THE ADVANTAGES OF SWITCHES

The convenient control of electric lights, by means of wall switches, is of the utmost importance; and it does away with the annoyance of groping in the dark for the pull chain or key of an individual socket. There should be a switch in the front hall and in each of the other rooms downstairs which are used often. It is possible to have one switch installed that will control several separate lights in the house or in the yard at the same time.

CONVENIENCE OUTLETS ARE HANDY

In planning housewiring, future needs should be considered. One or two appliances such as a washing machine and iron will be wanted at first. Later a floor lamp will be desired or a table lamp or a toaster. Unless provision is made when the wiring is first put in, it will be necessary to connect such appliances to lamp sockets. This is undesirable because it often means the removal of a lamp and it leaves the appliance cord hanging in the way. Convenience outlets are devices which are set in the baseboard and sometimes in the wall and to which appliances can be connected. It is best to install outlets which have slots shaped like a "T" so that any kind of an appliance plug can be used.

"The Home of a Hundred Comforts," issued by the General Electric Company, is an authoritative publication presenting the advantages of complete wiring. It is a guide not only in planning the installation itself but in the choice of appliances and devices that will give the greatest effect to the housewiring. The book is handsomely illustrated and contains practical home wiring diagrams. It may be obtained from any qualified contractor or by writing direct to the Merchandise Department, General Electric Company, Bridgeport, Conn.

THE VALUE OF CORRECT LIGHTING

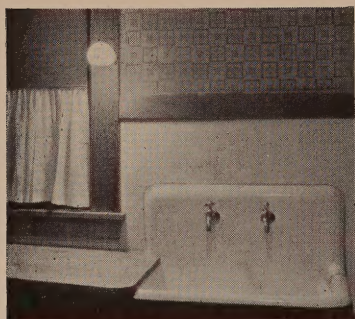
Good lighting in the farm home and in and around the farm buildings probably contributes more to the comfort and happiness of all members of the family than any other single convenience. Every member of the family uses this convenience more hours each day, and more days in the year, than any other one thing—even including the automobile.

The value of sufficiently bright lighting, properly located and protected, and instantly available by tipping a switch can hardly be over-estimated.

Oil lamps burn the oxygen out of the air, making it unfit to breathe, and thus often cause ill health. The comparatively poor light they give discourages reading and study and if used extensively may impair the eyesight. With them there is the ever present danger of fire. Electric lighting is odorless, consumes no oxygen, and gives the most flexible kind of artificial illumination with the least danger of fire.



Electric lights on the tree made Christmas on this South Dakota farm merrier than ever



Individual lights are advisable where the most work is done

SELECTING LIGHTS FOR THE FARM HOME

The selection of the exact fixture for any specific room is largely a matter of individual taste. In order to provide a sufficient quantity of light, a lamp of the right size in the right location is necessary. In order to direct this light on the surfaces where it is wanted and away from the eyes of persons where it is not wanted, the proper reflectors and shades are necessary.

For a good kitchen light, an opal glass enclosing unit fixture set close to the ceiling can be used. If this has a 75- or 100-watt Mazda C lamp, it will provide ample light for a kitchen of average size. In addition to the ceiling fixture which furnishes general illumination for the room, it is desirable to install two or three small drop or wall bracket lights in open-bottom glass shades, using 25-watt Mazda B lamps so located as to furnish the sink, work table and stove with extra light. Frequently farm homes have a large pantry or kitchen closet in which there should, of course, be a light, generally located near the ceiling in a glass reflector.

The artistic glass and silk shades which are used extensively are excellent for the dining room lights. Best results will be secured if the lamps are hung two feet above the table, as in this position they supply plenty of light for the table and soft illumination for the rest of the room. A 75- or 100-watt Mazda C lamp should be used.

In the living room, center ceiling lights, requiring usually about two or three 50-watt White Mazda B or a cluster of four or five 25-watt all-frosted round bulb Mazda B lamps, are frequently used for general illumination. It is better practice, however, to use portable table and floor lamps to light this room. Portable lamps furnish good direct light for reading or sewing and are more cheerful and home like.

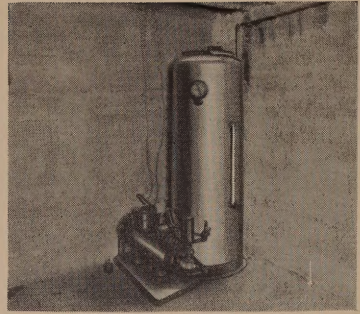
Many people prefer to have their bedrooms lighted with wall bracket lamps using 25- or 40-watt round, all-frosted Mazda lamps. These should be covered by glass or parchment or silk shades. There should be a bracket lamp on each side of the bedroom mirrors in order to obtain even illumination. Where furniture is moved about occasionally, bracket lamps should of course not be used, and a center ceiling light with a 50-watt White Mazda lamp in an open-bottom glass



Dining room in a farm home lighted with a semi-indirect bowl fixture. There are many styles of fixtures to suit individual tastes

shade or an inverted bowl reflector is preferable. Wall bracket lamps are especially useful in the bathrooms of farm homes for use on each side of the mirror above the wash bowl. They should be mounted slightly higher than the head and about five feet apart and should be covered with a shade or mounted in a reflector.

The lamps specified above are recommended for use on 110-volt electric light, heat and power company circuits. For use on 32-volt individual plant circuits, 32-volt lamps of approximately one-half the wattage specified are required.

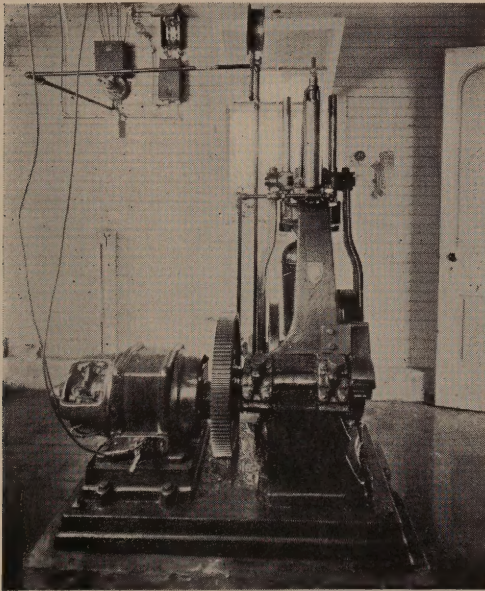


Small house pump and pressure tank located in cellar of farm home

ELECTRICITY CARRIES THE WATER

A water system is of particular benefit to the farm as it does away with one of the greatest burdens of the farm woman and permits her to do the work of the home much more easily and quickly. An electrically-operated water supply system is of economic value to the whole farm and a source of genuine comfort in the home.

Statistics show that on an average farm of 160 acres a family of six persons, with ten cattle, six horses, twenty-five hogs and twenty-five sheep will use 430 gallons of water daily. With an old-fashioned pump it takes at least an hour and a half to draw this. In a year this amounts to approximately 500 hours. At ten cents per kilowatt-hour, 100 gallons of water can be lifted 100 feet for one cent, which means that at the very most a few cents a day will provide a constant supply of fresh water. Compare this cost with that of a farm hand pumping by hand. These figures will not apply in every case, but they will serve as a basis of comparison and will assist in computing the costs of securing water by the old method and by the modern electric motor.



An electric motor connected to a pump which supplies water for the house and barns of a New York farm

FRESH WATER

IMPROVES STOCK

It has been proved that a constant supply of fresh water will cause beef cattle to produce more and better beef, and dairy cattle to give more milk. Stock will drink more fresh water than stale water. Ninety per cent of their weight is water; and it is water, in a large measure, that goes to make up bone and muscle to fatten them for market. An electric motor, using a small amount of current, will pump plenty of fresh water for stock. Automatic attachments for starting and stopping the pump are available.

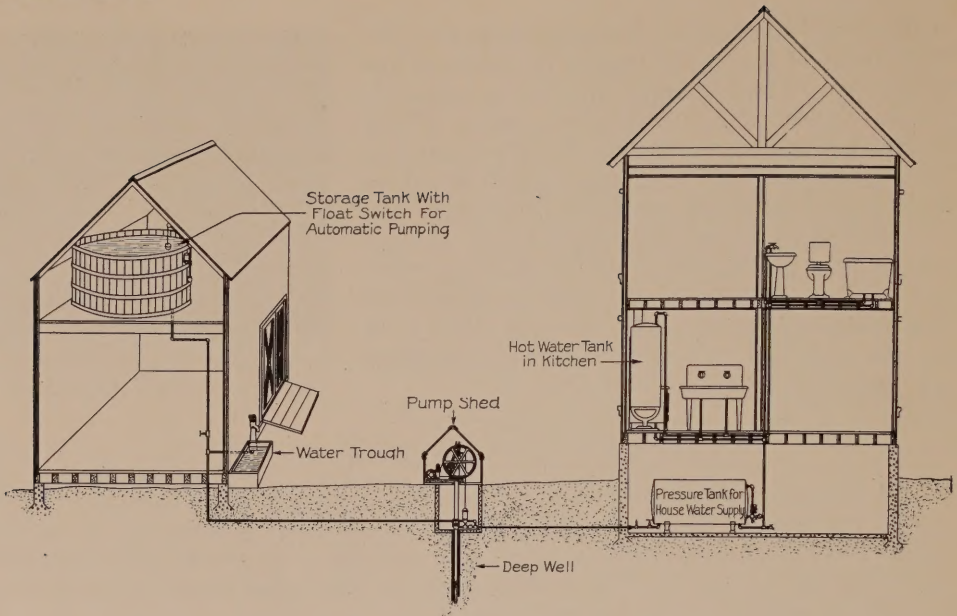
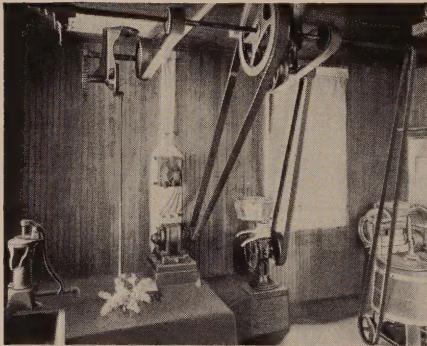


Diagram showing deep well electric pump installation which provides water for both barn and home use



In this farm home one electric motor pumps water for the house, separates the cream, does the churning, and runs the washing machine



An electric range, dishwasher, and other appliances are used in this California ranch kitchen

There are a number of good electrically-driven water supply systems on the market. The outfits used in the home consist of an electrically-driven pump which raises the water into a storage tank or forces it into a pressure tank. Some systems provide that when the water in the reserve tank drops below a certain level or pressure, the motor automatically starts to pump and continues to operate until the tank is again filled. Other arrangements require the starting of the motor by hand; but after pumping for a limited time under electric power it automatically stops. These water systems can also be used to fill heating tanks connected to the kitchen stove and thus provide hot water in the bathroom and other sanitary facilities as in the city.

ELECTRICITY DOES THE HOUSEWORK

Washing is doubtless the farm woman's hardest single task. Where she is forced to carry the water and

do the washing with old-fashioned tubs and a scrubbing board, it is one of the hardest jobs on the farm. It is practically the work of a day and in most homes one day a week is set aside as washday.

An electric washing machine reduces the old-fashioned washday to a period of one or two hours. It saves time, strength, and wear and tear on the articles washed. Next to the electric water supply system it is the electrically-driven machine that is of most benefit to the housewife.

THE ELECTRIC WASHING MACHINE

Electric washing machines can be divided into four general groups according to the principle of operation. These are the dolly type, the cylinder type, the oscillator type and the vacuum type. There are a great many styles and variations of each type ranging from a low price dolly washer to the higher priced vacuum cup washer. There is one general principle, however, on which all clothes washing by machine is based and that is the agitation of clothes and water for the purpose of forcing the soapy water through the fabric. Soapy water passing and re-passing through the weave of the cloth loosens and dislodges the particles of dirt and carries them to the bottom of the tub. Washing clothes in a machine requires no further knowledge than hand washing, as given plenty of hot water and soap, the machine does all the work.

Practically all types of electric washing machines now have power wringers. The wringer is of great assistance as the housewife has only to feed the clothes to it.

The actual cost of a washing machine is the first cost plus the cost of operation and maintenance divided by the number of years it is used. Any good electric washing machine will operate for from two to five cents an hour depending upon the cost of current. Estimating a total use of two hours a week, the cost of doing the washing electrically is much lower than by hand if the saving in time is considered. The usual life of a washing machine is ten years or more according to the care given. Many have been known to last much longer.

When selecting a washing machine it is best to consult the nearest dealer who has several types on display. He is usually well qualified to



Small farm in Illinois served with electricity



The radio program doesn't interfere with ironing when an electric iron is used



An electric vacuum cleaner speeds the house cleaning

advise in the purchase of a machine and if any question of operation later arises, it can be settled quickly.

The most popular types of machines are those with the motor built in as a part of the washer. Such a machine can be used wherever there is an electric light socket or convenience outlet without such interference with other work as is often the case with machines driven by belt and located in an outbuilding.

TAKING THE HEAT OUT OF IRONING

To the farmers' wives and daughters who have in the past dreaded ironing day, especially in the summer time because of the tiresome job of heating old-fashioned sad irons on a stove, electricity will bring another time-saving boon. The electric iron heats in a few minutes and continues hot until the current is turned off and the ironing is finished. It takes less time to iron the weekly batch of clothes because it is not necessary to move from the ironing board. It is not necessary to stay in an overheated kitchen on a summer day when an electric iron is used as the ironing can be done wherever there is an electric light socket or convenience outlet.

Electric irons are made in weights from three to twenty-five pounds and for either 32-volt or 110-volt current.

WHAT THE VACUUM CLEANER DOES

Electric service does away with the semi-annual week of house cleaning when the rugs are taken out and beaten and the house turned topsy turvy. It also makes unnecessary the usual week-end cleaning day when carpets are swept and dust thrown over the home and furniture. Electrical labor

and time-saving appliances change this hard task to an easy thing, accomplished in a half hour or so two or three times a week.

The electric vacuum cleaner keeps the home clean without laborious sweeping. It sucks the sand and grit and dirt from between the tiny fibers of carpets or rugs into a bag which can be emptied in a moment. No dust is raised and as little effort is required to push it back and forth across the floor as is needed to push a carpet sweeper.

The electric vacuum cleaner is used for other purposes than cleaning the floors. Attachments that are usually included with the cleaner can be used to clean upholstered furniture, blankets and mattresses, book shelves, bureau drawers, closet shelves, curtains and overdrapes, heavy cloth table covers, fur coats or other heavy clothing, inside of pianos, the walls, mouldings and picture frames, silk lamp shades, upholstery and floor rugs in automobiles, women's hats, and in fact anything which has hard-to-get-at nooks and crevices harboring dust or dirt.

Because of the large number sold, vacuum cleaners are reasonably priced and are an especially good investment when it is considered that a good vacuum cleaner will give many years of satisfactory service.

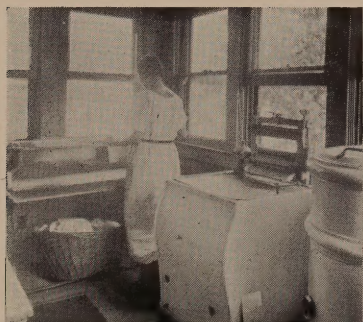
THE SEWING MACHINE WITH A MOTOR

Electricity brings another convenience for the farmer's wife who makes her own and the children's clothes. Electrically-operated sewing machines work at a much faster speed, can be stopped or started in a moment, and are practically as simple to use as those operated by pedal. Sewing machine manufacturers now include among their many styles one with the electric motor installed as a part of the machine. The family that has a good sewing machine can adapt it to electric drive by the addition of a small electric sewing machine motor, easily attached.

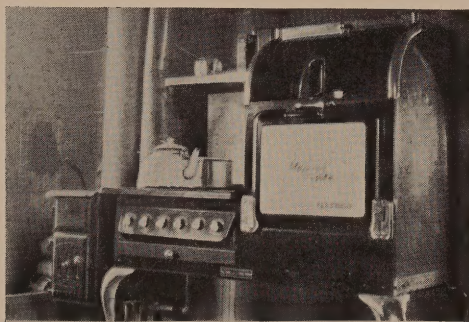
MANY FARMS HAVE ELECTRIC RANGES

Many farms now have electric ranges to take the place of the old-fashioned stove for cooking. Thousands are in use in California. They are also being used in many other states where electricity is available, with highly satisfactory results.

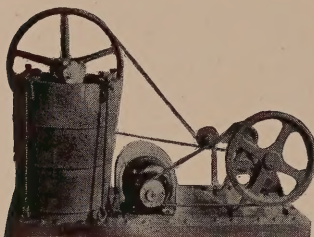
The electric range is the ideal method of cooking. The heat is concentrated just where it is wanted and very little passes off into the air. Some electric ranges are equipped with a device that keeps the heat of the oven at any temperature desired and another device that turns off the heat



An ideal home laundry with an electric washer and ironer in a California ranch home



The farmer's wife is keeping up with her city sister in adopting the electric way of cooking



The electric motor willingly makes the Sunday ice cream

automatically at any time the housewife desires. During the northern summers, in the South and in the far West an electric range is especially convenient. Its heat is available at the turn of a switch, the cooking is accomplished without overheating the kitchen, and the carrying of fuel and ashes is eliminated.

Other Valuable Appliances

ELECTRIC FANS

A surprisingly large number of farm homes use electric fans for keeping the kitchen cool while cooking and other daily work is being done. Fans are also used for drying fruits and vegetables, drying clothes indoors, and for similar purposes requiring a strong, direct breeze.

UTILITY MOTOR

A small electric utility motor in the farm kitchen can be made to operate several appliances; such as an ice cream freezer, meat grinder, some types of bread mixers or egg and cake beaters. Several other household appliances can be adapted to motor operation.

TOASTER AND PERCOLATOR

Among the popular electric table appliances are the toaster and percolator. They are comparatively inexpensive in first cost and current consumption and can be set on the table for the early morning breakfast. To use them it is merely necessary to turn on the current.

Toasters are made that will toast two or more slices of bread at a time. Percolators are likewise available in several sizes with capacity for brewing from five to ten cups of coffee at one heating. Table appliances such as these are particularly useful where a meal is wanted quickly and without the bother of using the wood or oil stove.

ELECTRIC REFRIGERATOR

It is possible now to have an automatic electric refrigerator which does not require any ice. It is useful where natural ice is expensive or difficult to obtain. Manufacturers claim that the cost of operation is somewhat less than the cost of ice even in sections where ice is not expensive.

ELECTRIC HEATER

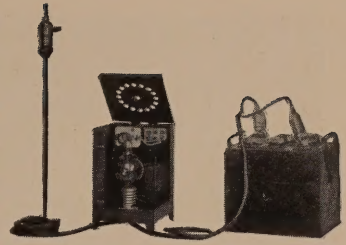
Not all farm homes are equipped with furnaces and as a result the use of small electric heaters is increasing. The electric heater can be connected to a current outlet and gives a strong, concentrated heat wherever it is wanted. It is of particular value in heating a small room which is to be used for a limited time.



An electric fan blows the heat out of the kitchen

THE TUNGAR BATTERY CHARGER

The farmer who owns an automobile or a radio set using storage batteries can well appreciate the worth of the Tungar Battery Charger, which charges a storage battery as quickly and as well as can be done by the battery charging station or garage in town. The Tungar Battery Charger is simple to operate, it merely being necessary to connect one lead to the lighting circuit and two clips at the end of a second lead to the terminals of the storage battery. It charges during the night without being attended. The cost of operation is small.



Method of charging a storage battery

THE TRIPLE TAP

Often after a house is wired it is discovered that there are not sufficient convenience outlets to accommodate appliances which have been purchased or received as gifts. A simple little device known as a Triple Tap is made for service where new outlets are wanted. The device itself consists of three convenience outlets on a ten-foot lead which can be connected to an ordinary lamp socket or a convenience outlet.

BELL RINGER

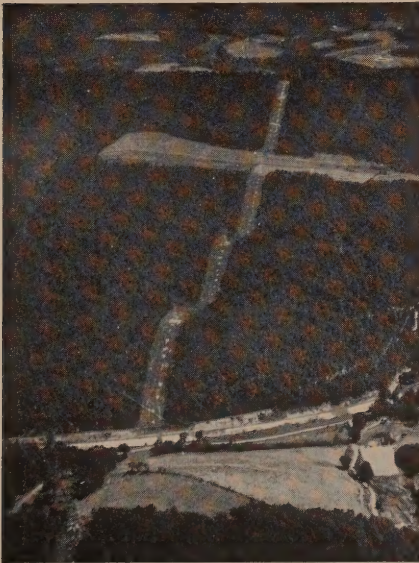
The bell-ringing transformer is a very useful little electrical device through which a doorbell can be connected directly to the lighting circuit. Batteries are unnecessary when it is used and the bell is always ready for service. It can be used in connection with bell signal systems connecting the house and other buildings of the farm. Complete signal and fire alarm systems for farm use are now on the market and have demonstrated their value on the larger farms.

Lighting of Farm Buildings

Proper lighting in barns and out-buildings is as essential as in the farm home. It is often necessary to do work before or after daylight and the unsafe oil lantern is not satisfactory for this purpose, principally because of the limited range of light.

In wiring farm buildings, conduit or armored cable should be employed. While there is no likelihood of fire with insulated electric wires, moisture or ammonia fumes may rot the insulation, rubbing against walls may wear it or rats and mice may gnaw it, causing live wires to be exposed. Where the wires are run through conduit or a lead sheathing the insulation will not wear off or leave live wires exposed.

To avoid breakage of lamps in sheds, at the silo chute and similar places, wire guards can be used. In dairy cattle exercise barns or other



© Underwood & Underwood
Aerial Department, N. Y.

High tension transmission line carrying electric current from generating plant to users in surrounding territory



Night view of poultry house lighted by electricity to stimulate egg production

buildings where stock is allowed to run loose, switches should be placed at least six feet from the floor so that stock cannot strike against them. It is best to fasten over them a wooden box-like cover with an open bottom, as cattle will sometimes attempt to investigate an exposed switch with their tongues. It is advisable in barns and especially in dairy buildings to install porcelain or moisture-proof switches and wiring devices. They last longer and are generally far more satisfactory than metal devices in outside installations or where there is much moisture.

In the horse barn or cow stable, lights are usually located in the feeding or cleaning alleys between the stalls. They should either be placed one behind each stall or spaced not more than twelve feet apart and equipped with 25-watt Mazda lamps. Enameled steel dome reflectors are used extensively as they concentrate the light at the point where it is most needed. The full benefit of each lamp is obtained in this way and very little light is absorbed by the ceilings or walls. Where there are ten or more stalls it is economical to have the lamps divided into two or more circuits so that it is only necessary to light the section of the barn where work is being done.

Every farmer who has groped around in a dark hay mow will appreciate the value of a good electric light when throwing down hay for horses or cattle. A 100-watt Mazda C lamp with an enameled steel dome reflector will give the best results in most lofts.

The silo and granary should be lighted with a 75- or 100-watt Mazda C lamp and an enameled bowl reflector centered in the roof. This combination gives satisfactory illumination in the silo even when it is only a quarter or half filled. A 25-watt Mazda lamp should be located near the chute or entrance to the silo for easy handling of the ensilage.

In the dairy, garage, carpenter shop and like buildings the usual practice is to have a center ceiling socket equipped with an enameled steel dome reflector and a 75- or 100-watt bowl enameled Mazda C lamp. Lights so installed should be controlled by a switch at the door. In cases where the building is used but infrequently and then only for work requiring a small amount of light, 25-watt Mazda lamps are suggested. Large rooms may require two or more ceiling lights and in the work shop or garage a small light over the work bench is helpful. For every such lamp a porcelain enameled steel reflector should be provided.

The illumination of outbuildings in general depends entirely upon their size and the extent to which they are used for night work. Sheds housing beef cattle, sheep, or hogs do not as a rule require much illumination and 25-watt Mazda lamps in reflectors, placed ten to twenty feet apart, will be sufficient.

Increasing Egg Output Electrically

Electric lights in the poultry house are a source of profit to the farmer. This is proved by scores of cases in which the artificial light method has been used to stimulate egg output. It should be noted that the increase in eggs comes at a time when market prices are highest and the method may be followed by any farmer whether he has a small or large flock.

The use of electric lights in the winter gives the hens practically the same daylight conditions as in the summer. Hens produce more eggs in the summer because the long days permit them to consume enough food to maintain health, and enough in addition to give them an excess for eggs. They also get more exercise, another important factor in egg production.

The U.S. Department of Agriculture has conducted a number of tests with electrically lighted poultry houses. In experiments carried on during the fall and winter of 1920-21 and 1921-22, lights were used from November 1st to March 20th. Each year a flock of fifty pullets was used. The first year, during the period when electric lights were used, the pullets in the lighted pen produced fifty dozen more eggs than the same number in an unlighted house. The second year the pullets in the lighted pen laid over sixty dozen eggs more than an unlighted flock of the same size and quality. One 75-watt lamp was used for two and one-half hours daily for 140 days. It was turned on at 4:30 o'clock in the morning and allowed to run until daylight, being turned off by the poultryman when he went to work. It was turned on automatically by an alarm clock device.

The results of a large number of tests conducted by the government, agricultural colleges and individual farmers, show conclusively that it does pay both the man in the chicken business and the owner of a small flock to use electric lights.

Authorities assert that an average length of day of from twelve to thirteen hours gives the best results. The most convenient method is to add the extra light in the morning, although some poultrymen use lights both morning and evening. The hours added to the hens' working day should be the same in either case. If the day is made longer than thirteen hours the birds are forced too much. When lights are used in the evening some arrangement should be made for dimming them so that the hens will have time to get on the roost before the coop is entirely dark. There are automatic time switches on the market for turning lights on in the morning and devices for dimming them in the evening. By the use of two lights in a coop, one large and the other small, it is easy to turn off the lights gradually where special apparatus is not used.

HOW TO LIGHT THE POULTRY HOUSE

The New York State College of Agriculture, which has investigated poultry house lighting, recommends the following method:



*Electric lights in a poultry house
on a Utah farm*

A 40-watt Mazda lamp should be used with a cone-shaped reflector 16 inches in diameter by 4 inches high. The light should be hung 6 feet from the floor above the head of a person passing in or out, and out of reach of the birds. The reflector should allow some direct rays to strike on the perches. Lights should be spaced 10 feet apart along a line midway between the front of the house and the front of the dropping boards.

As a general rule, to find the number of 40-watt Mazda lamps with reflectors that will be needed for a given size of pen, divide the number of square feet of floor space by 200. The nearest whole number will be the number of lamps required. For example, a coop 15 by 15 feet will have 225 square feet and one 40-watt Mazda lamp will be sufficient. A poultry house 15 by 50 feet will have 750 square feet which divided by 200 equals $3\frac{3}{4}$. In this case four lamps with reflectors are necessary. They should be spaced 10 feet apart and the end lamps 10 feet from the ends of the pen.

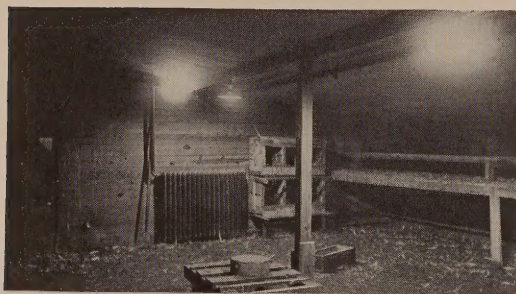
ELECTRIC WATER HEATERS

Electricity is also being used for other purposes in poultry raising. Plenty of fresh water is necessary when hens are eating, and during the cold northern winters it is often a difficult problem to keep the water in the hen house from freezing.

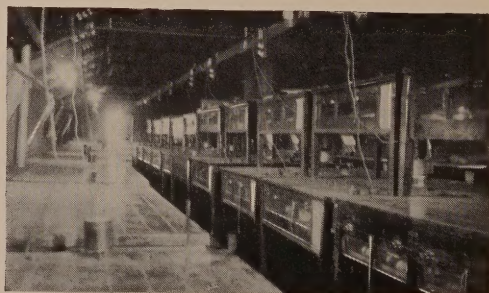
The Department of Agriculture has used a small electric light bulb immersed in an open pan of water for this purpose. The bulb is covered tightly with a piece of black cloth so that no light is thrown into the pen. In using this method care must be taken not to have the socket touch the water. Small electric immersion water heaters can be obtained at electrical stores. The immersion heater can be connected to the lighting circuit and turned on with the lights in the morning. Most of those on the market at the present time are made to heat a small vessel of water to a high temperature. Where they are used in the poultry house, they should be operated only for a short time so that the water will not become hot.

ELECTRIC INCUBATORS

The temperature of incubators must be closely maintained, and as electricity lends itself readily to close regulation it is the ideal source of heat for hatching. Where rates are low it is used extensively to furnish all the heat needed, while for regions of higher power rates, oil is being used to furnish nearly all the heat, and electricity to supply the small supplementary



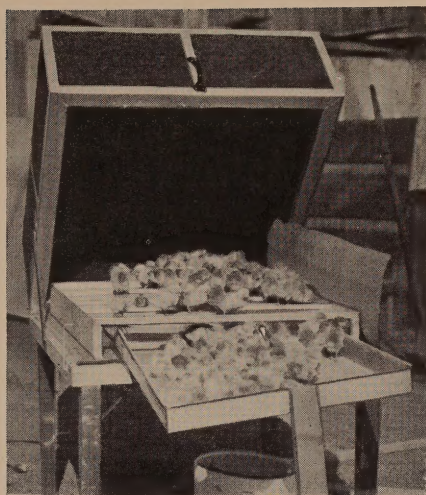
In this electrically-lighted, steam-heated New Jersey hen house the hens have summer all winter



Electric incubators in a California hatchery with a capacity of 504 eggs each



*Repairing an automobile fender
with an electric drill*



Hatch from a 250-egg electric incubator

amount required to maintain and control the correct temperature. Electric fans are being increasingly used to provide ventilation and even heating in the egg chambers.

Efficiency in the Workshop

Electricity places at the command of the farmer many tools for making repairs quickly which formerly were available only in the nearest town, often miles away.

In the general workshop, carpenter shop, or garage where repair work is done, a motor connected to a line shaft is a good investment. It need not be of large capacity to run several tools. An emery wheel, grindstone and perhaps a woodsaw can be used. Sometimes machines such as root cutters and feed grinders can also be connected.

THE ELECTRIC DRILL

The portable electric drill is a handy tool in the workshop. It is often used when it is desired to join the two pieces of a broken iron frame of a farm machine. Holes are bored in each part near the break, and reinforcing steel plates are bolted on tightly. Electric drills are made in several sizes. A medium-sized drill with a wide range of drilling sizes is best for farm work.

SOLDERING ELECTRICALLY

The electrically-heated soldering iron also finds considerable use on the farm for repairing leaky pails or cans and for doing other odd jobs. It is merely necessary to connect the lead to an electric current outlet to operate it. The heat is concentrated in the tip which stays hot constantly while the soldering is being done.

The Motor in the Barn

The power required for home appliances and the smaller farm machines, such as the cream separator, is supplied by fractional horse power motors, that is, motors rated below one horse power.

For the heavier work in the barns, motors of from one to five horse power are used most commonly in the East and Middle West. They are adapted to a variety of farm work and can therefore be used more frequently and with greater economy.

In the Far West and Southwest, especially in the irrigated districts, motors from five to twenty horse power and over are being used extensively. Farms in the Middle West and East are also using large motors but the use of such motors is limited to farms which demand a large amount of power. Before discussing the application of the electric motor it is important to consider briefly its advantages in farm work.

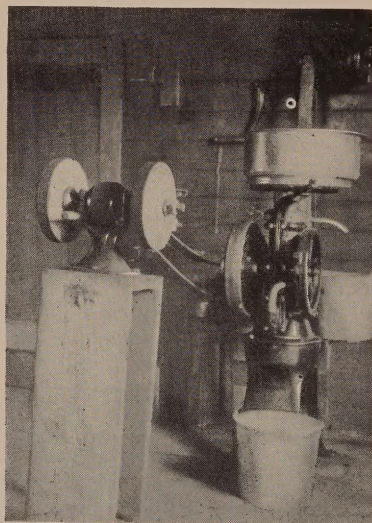
The electric motor is more reliable than any other type of power mechanism, for there are fewer parts to get out of order, only two bearings to oil occasionally, nothing to be affected by frost, and practically no attention is required. It starts at the touch of a button or switch in any weather, requires no fuel or water and can be controlled instantly from any distance. It can be made to work automatically and it has a more constant speed than the gas or oil engine. It weighs from one half to three-fourths as much as an equivalent gas engine, will carry a very much greater overload for a short period, and can be obtained in all capacities.

A motor mounted on a hand truck or small wagon frame so that it can be moved easily is a good investment for the farm having seasonal work that a motor can do quickly and well. The size of the portable motor should, of course, be determined by the work it is to do. If there are two machines that a three-horse power motor can drive, and five that require a five-horse power motor, the five-horse power motor is the proper one to use.

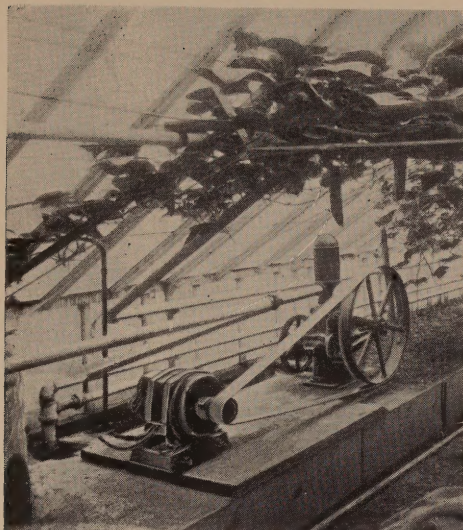
If there are several daily jobs each requiring a three-horse power motor for two or three hours, it may be possible so to locate the machines that a stationary motor can be belted to a line shaft from which each machine can be driven. In still other cases it may be more economical to have a separate motor for each operation. The particular conditions of each farm will decide which method is the better.



Repairing a milk can with an electric soldering iron



This tool grinder is run by the same motor that operates the cream separator



Greenhouse on a truck farm in New York which is provided with water by an electrically-driven pump



It doesn't take long to saw wood if the electric motor furnishes the power

HAY HOISTS

Hay hoists equipped with electric motor drive effect a considerable saving in time at a season when speed is especially important. A load of hay can be hoisted into the mow and placed in a much shorter time with an electric motor than by other methods. There is a substantial saving in the expense of hay rope, in time and in hoisting, and a team of horses is released for other work. Motors used for hoisting hay and similar work range from three to fifteen horse power, the most commonly used being of five horse power.

FEED GRINDERS

Feed grinders, fanning mills, and root cutters are being run by electric motors where current is available. They are economical and profitable and have advantages that justify an extensive use.

For the efficient operation of a feed grinder, automatic electric control is the most satisfactory as grinding can be done at night when power is not being used for other purposes. By this arrangement the grinder is equipped with a large feeding hopper and receiving bin, and when the grain in the hopper is exhausted the machine stops automatically.

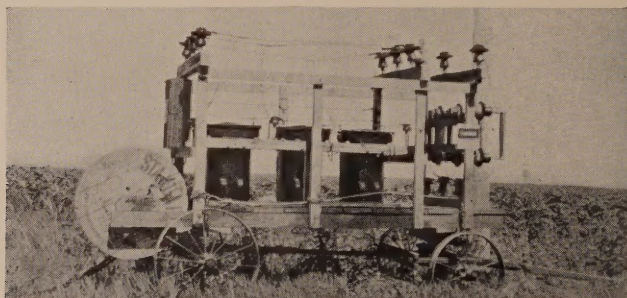
In grinding feed, pumping water, or any everyday job, it is preferable to have a small motor operating several hours a day instead of a large motor running a short time. Large motors, using considerable power for a short time, require large line transformers. It is more economical to use small motors, requiring small transformers for a longer period. In this way the amount of power consumed is distributed more evenly throughout the day.



Portable farm motor wagon filling a silo on a Kansas farm



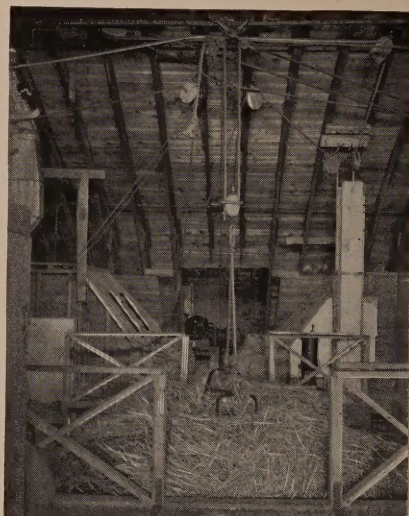
Ten-horse power motor belted to an alfalfa cutter on a California ranch



Large portable transformers through which current is supplied to a portable motor for threshing and ensilage cutting



An electric motor and feed grinder near the feed bin is the ideal arrangement



Hay hoist operated by an electric motor which does the work of a team of horses

THRESHING AND ENSILAGE CUTTING

Whether it is economical for the average farmer to do such seasonal operations as threshing and ensilage cutting by electricity depends upon the size of the farm. It would hardly be profitable for the owner of a small farm to buy a large motor for these operations because the motor would be used only a few days each year. On a large farm, however, where the motor could also be used for other purposes throughout the year, it is profitable.

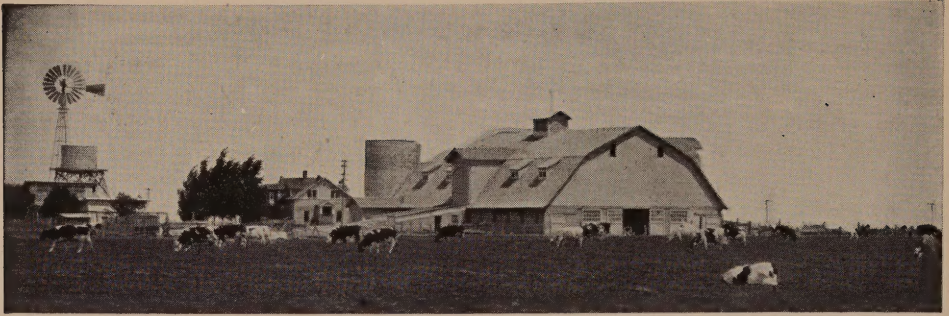
In some communities portable power outfits, consisting of the necessary transformers and a large motor, travel from farm to farm. There is an electric light, heat and power company in Kansas that has a portable motor outfit which it rents to farmers for ensilage cutting, threshing, hay baling and rock crushing. The farmer pays a reasonable charge per hour for the service of the equipment and an attendant and for the amount of current consumed.

Such large portable motor outfits have been successful in practically every instance where they are used. They are looked upon by some as the solution to the problem of doing heavy seasonal farm work.

Ensilage cutters require motors of from ten to twenty-five horse power, shredders and huskers from ten to twenty horse power, and threshing machines from ten to fifty horse power according to the capacity.



Grain dust doesn't bother the three-horse power motor operating this feed grinder on a Middle West farm



Buildings on an electrically equipped dairy farm in Idaho

The Electrical Dairy

Electric power is being used more in the dairy than on any other part of the farm except the home. The reason for this is that the dairy requires a source of power that is sanitary and can be depended upon day in and day out to pump water, milk cows, separate cream, grind feed and perform other regular duties. Electric motors save time and make it possible for one man to do work that ordinarily requires two or more by less speedy and more laborious methods.

A clean, light barn is essential if cows are to give their best yield and milk kept free from contamination. The barn should have sufficient windows to give good light and fresh air. It should also have electric lights so that plenty of illumination is available for early morning and late afternoon milking.

THE COW NEEDS FRESH WATER

Plenty of fresh water is one of the principal requirements of dairy cows and, in producing milk, is as important as enough feed. A cow will not drink enough from a large tank of stale water to produce as much milk as she should. Neither will she drink enough if she has to get her supply of water from an ice cold brook in the winter or from a stale pasture pool in the summer. The one way to make sure that the cow is getting ample water is to provide it fresh and not too cold. The electric pumping system does this at a slight cost and will keep a concrete drinking trough in the barnyard or a water bowl in each stall filled throughout the year.

COW CLIPPERS AID IN CLEANING

A good grade of milk cannot be produced by cows that are not properly cared for or are kept in dirty stables. To keep even a small herd of cows clean is a difficult job but one that is worth while. It can be done quickly if time is devoted to the work each day. Cow clippers are of great value in keeping the flanks, thighs and udders of the cow free from the long hair to which particles of dirt and manure adhere. When an electric motor drives the clippers there is no handle to turn and one man can do the job.

Stock vacuum cleaners are also of value in grooming the cow and keeping her free of dust and germs. At the present time they are used principally on large dairy farms having expensive pure-bred cows and registered stock. While such cleanliness has not been practiced by the general run of farmers in the past and even today is somewhat unusual, more and more care is being given dairy cows because of the additional milk profit resulting.

THE SEPARATOR RUN BY A MOTOR

The cream separator is a very common appliance on the farms in some sections of the country. Its value is better realized when we consider the results of a typical experiment conducted over a period of one year by the Indiana Agricultural Experiment Station to determine the best method of separating milk. One cow's milk was used. Water dilution lost 40.5 pounds of butter, shallow pan gravity setting lost 26.2 pounds of butter, deep setting lost 10.1 pounds of butter, but the mechanical cream separator lost only 1.2 pounds.

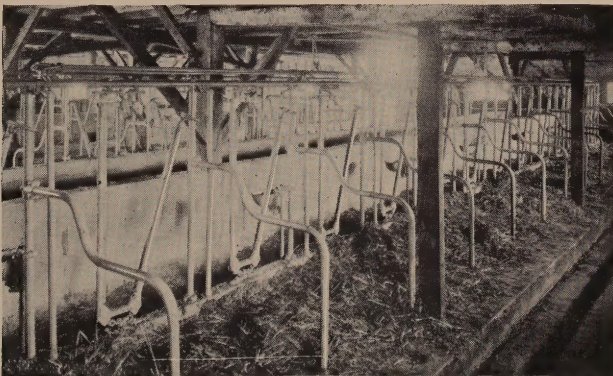
Where there is current the electric motor provides the best power for running the separator. It turns neither too fast nor too slow, but at the correct speed always. Furthermore, it does the work much quicker and leaves the farmer or his wife free to do other little jobs about the dairy while each bowlful is being separated. On one small farm it was stated that two and one-half hours a week were saved by the motor-driven separator. Electricity also does the job less expensively as it is estimated that 700 pounds of milk can be put through a separator for one cent's worth of electric current. This is based on a cost of ten cents a kilowatt-hour, but even at double that rate electricity is still far cheaper than hand power.



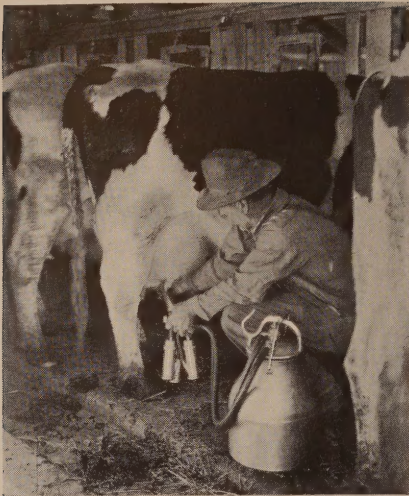
*Cream separator belted to a line shaft
run by an electric motor*

MILKING MACHINES ARE PROFITABLE

To the farmer with five or six cows, milking twice a day is not a hard task, but merely a small part of the daily routine. If he has a herd of ten or fifteen or more cows milking becomes a laborious, time-consuming job. More than fifty years of development work has, however, resulted in the milking machine which does the milking quicker and better than can be done by hand.



*Electric lights, fresh water bowls, and electric milking machines
are part of the equipment of this modern Ohio cow barn*



Even the farmer with only a small herd finds it profitable to use a milking machine

The number of these machines being used with success on common farms today by ordinary farmers is good proof of their merit. They have an established place on the modern farm, because they have demonstrated that they are a practical, profitable machine.

The U.S. Department of Agriculture has investigated the time saved by milking machines, and reports that on farms keeping fifteen cows or less it takes 7.3 minutes to milk a cow by hand and 4.8 minutes to milk a cow with a mechanical milker. On a herd of fifteen cows the saving in time amounts to $37\frac{1}{2}$ minutes at each milking or $1\frac{1}{4}$ hours a day. On a herd of sixteen to thirty cows the saving amounted to 2.4 minutes per cow per milking, on a herd of thirty-one to fifty cows the saving was 2.75 minutes, and on herds of over fifty-one cows, the

saving increased to 3.9 minutes for each cow.

The University of Illinois has also made investigations, one of which includes cost records from sixty-six Illinois farms over a period of six years. The average annual expense of keeping a cow was found to be \$18.64 when the cow was machine-milked and \$23.44 when hand-milked. Labor was figured at $17\frac{1}{2}$ cents an hour which is, of course, low. It was found also that it takes 133.9 hours per year to milk a cow by hand as against 81.5 hours to milk with machine.

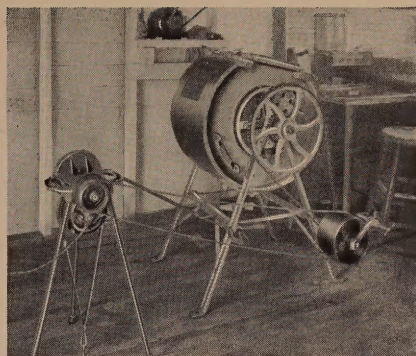
Particular attention should be given to the cleaning of the machine after each milking. If the machine is properly cleaned, the milk is better than when milked by hand, as particles of dust and dirt are kept out of the milk by the machine. Milking machine manufacturers furnish electric motor-driven vacuum pumps with machines that are to be used on farms having electric service.



The milking is done quicker on this California dairy farm where electric milkers are used

TAKING THE WORK OUT OF CHURNING

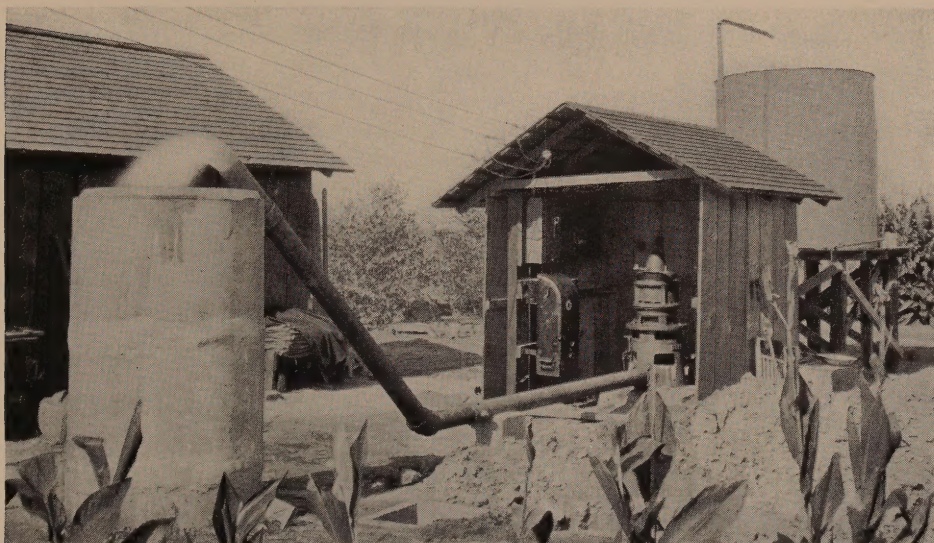
The hard work of churning, too, can be done electrically. Pumping the old style vertical churn or turning the old-fashioned barrel churn by hand has been done away with on farms having electric current. Thirty-three pounds of butter can be churned for one cent if electricity furnishes the power, estimating on the basis of ten cents a kilowatt-hour. At least an hour a week can be saved on the average farm and the labor of doing it by hand is eliminated. Both barrel and dasher type churns equipped with electric motors are being used on farms. Portable motors are being used in some instances to drive the churn, cream separator and washing machine. Some farmers have rigged up a line shaft and are using one motor to drive several appliances.



Portable motor driving a barrel churn

Motors to run appliances can be obtained for either 32-volt or 110-volt current so that they can be used with either farm light plants or electric light, heat and power company service. To make certain that the motor used is the best for your purposes, give the dealer full information about the kind of electric service you have.

We have discussed only the machines driven by electricity which are most commonly used by farmers the country over. On large dairy farms supplying milk direct to the cities, electrically-operated refrigeration systems, bottle washers and fillers and many other machines are in use which are not as a rule found on the average dairy farm.



Vertical electric motor and control operating a deep well irrigation pump on a California ranch



Electric motors operating irrigation pumps have made—

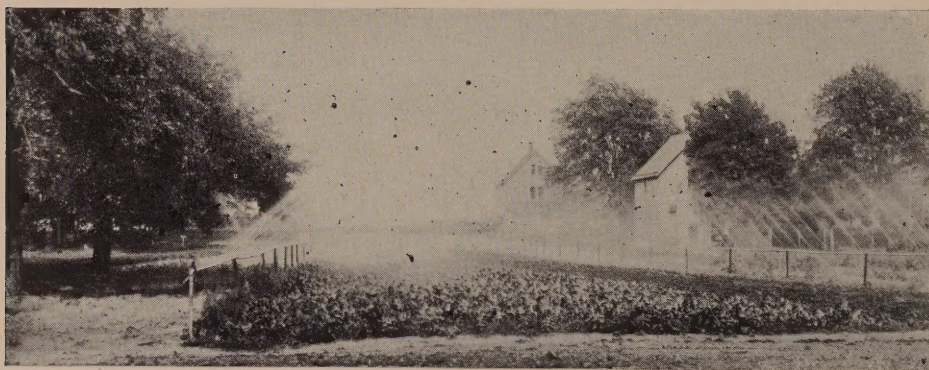
Motors Are Best for Irrigating

Electric motors have supplanted other power apparatus for driving irrigation pumps. The Shasta Valley in California yields an annual harvest of \$480,000 from land irrigated entirely by electrically pumped water. Along the Snake River in Oregon and Idaho there are several electrical

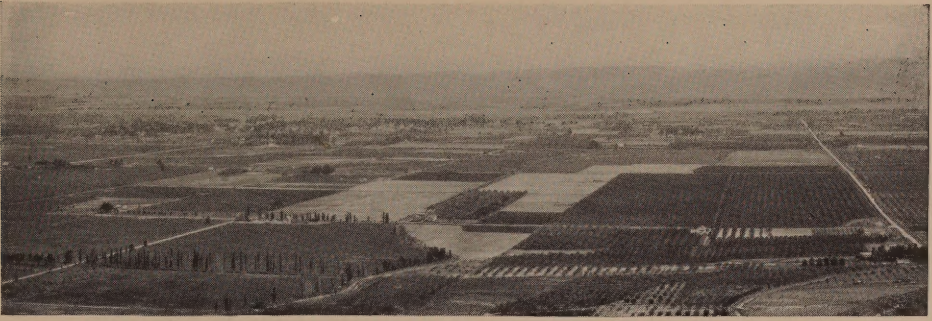


Small irrigation pumping plant and reservoir on fruit farm

pumping installations, some of which elevate water as high as 150 feet and irrigate as much as 15,000 acres of land. The Prickly Pear irrigation project near Helena, Montana, where General Electric installed one 600-horse power motor, is producing big harvests of peas, oats, wheat and alfalfa.

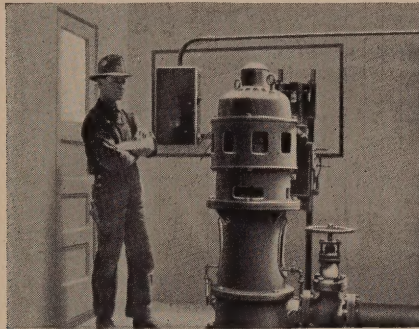


Electric motors can be used profitably to irrigate the market garden



a fertile country of this land, once almost barren

The application of electricity to irrigation through the reliable electric motor has simplified and economized the process, especially for the farmer with a small holding. The electric motor is instantaneously available and always dependable. It can be run for months at a time without shutting



Deep well turbine pump driven by a 25-horse power motor which irrigates a 40-acre California prune orchard

down the plant, and there are thousands of electric pumping installations which run twenty-four hours a day for six months at a time. This is possible because an occasional oiling of the motor bearings is the only attention necessary. The electric motor has the added advantage of remote control, the farmer being able to stop and start it with remote control equipment, even if he is several miles away.



Method of applying electrically pumped water to irrigated land



Irrigation reservoir on western ranch. Power line may be seen in background at left, transformers and pumping plant at right

It has been found that generally the farmer wants to install too large an irrigation system. The ideal plant is one that operates continuously and has a storage reservoir so that a large expensive pump is not needed.

With a small installation of this sort and a storage reservoir capable of holding all the water pumped over a period of twelve hours, the plant can be run all night. In the morning the farmer has a full reservoir from which he can water his land as needed throughout the day. At nightfall the reservoir is empty and it is again filled during the night.

The Value of Highway Lighting

Farming communities in many sections of the country are now taking an active interest in the lighting of highways. There are lighted highways in Massachusetts, Indiana, Michigan, Florida and other states and it is the favorable results of these pioneer examples that demonstrate the usefulness of lighted highways to a community.

Approximately fifty per cent of the farmers own and drive automobiles or trucks and a great many own both. Highway lighting minimizes the glare from the headlights of an approaching automobile, making it possible to see the car easily. It prevents accidents by showing up dangerous curves,



Night view of lighted highway showing the even distribution of light on the road

by illuminating signs, sides of roads, ditches and obstacles. It also adds to the comfort of night driving by relieving eyestrain, by giving plenty of light to make repairs, and by discouraging holdups.

Highway lighting benefits equally the farmer who uses horses for hauling his products to market and the pedestrian. As a rule the farmer goes to market early and often returns home late. A lighted highway enables him to make the journey speedily and without danger of collision, especially when he is driving a team and wagon lighted only by an oil lantern. Furthermore, the principal trucking is diverted from daytime to night, relieving the usual heavy traffic during the day, especially on the main highways between towns. In some cases, this makes it possible to delay expending money for increasing road widths, a very apparent need now in certain unlighted rural communities.

There is another important advantage in addition to the direct benefit of highway lighting. Highway lighting helps to bring electricity to the farms by providing the necessary poles and lines for distributing electric current. Electric light, heat and power companies can furnish current to the farmer more readily where highway lights are in use than where the power consumed by the farmer yields the only income from the line.

The Novalux Highway Lighting Unit was developed by the General Electric Company especially for highway lighting after careful investigation and test.



*Lighting units installed on a highway through an eastern farming district.
Inset—Closeup of Novalux lighting unit*

G-E PRODUCTS ARE RELIABLE

It is particularly important for the farmer, in wiring his home and buildings and in equipping his farm with electrical machines, to obtain products of unquestionable quality. Reliable wiring devices, lamps, motors, and appliances are especially necessary on the farm where the nearest dealer or agent may be in a town several miles away.

General Electric Company manufactures and sells many of the electrical products needed on the farm. Its products are reliable and are backed by the reputation and experience of the largest electrical manufacturer in the world. G-E Service—a part of G-E Products—results in the farmer getting the equipment which is best adapted to his special work. General Electric products are obtainable throughout the United States and are easily identified by the monogram .

WHERE TO BUY G-E PRODUCTS

WIRING DEVICES—General Electric Company manufactures a complete line of reliable wiring devices, some of the better known of which are:

BX Flexible Armored Conductor	G-E Tumbler Switches
Greenfielduct Rigid Conduit	G-E Convenience Outlets
G-E Threaded-Catch Sockets	

G-E reliable wiring devices are installed by qualified contractors and are sold by electrical dealers.

LAMPS

Edison and National Mazda Lamps

FARM LIGHT AND POWER PLANTS—General Electric engineers have assisted several manufacturers of farm light and power plants to develop the most efficient and economical generator for their machines. The G-E monogram on the generator of a plant is an assurance of reliable service.

RADIO—General Electric Company has been a pioneer in the development of many kinds of radio apparatus and manufactures many radio products which are sold by the Radio Corporation of America through dealers in practically every town and city.

ELECTRICALLY-DRIVEN APPLIANCES—General Electric Company has co-operated with a number of manufacturers in developing the proper motor for each particular appliance. As a result, it is possible to get many appliances equipped with G-E motors. The G-E monogram, a guarantee of good service and an indication that the machine is of good quality throughout, appears on the motors of many of the following machines:

Clothes Washing Machines	Cream Separators
Electric Vacuum Cleaners	Milking Machines
Utility Kitchen Motor	Portable Electric Drills
Domestic Water Pumps	

These machines are sold by electrical and hardware dealers who will be glad to tell you if the machine you want has a G-E motor.

ELECTRIC DEVICES—Other useful appliances and devices manufactured by General Electric Company and sold through dealers are:

G-E Electric Fans	G-E Soldering Iron
Tungar Battery Charger	G-E Triple Tap
G-E Wayne Bell-Ringing Transformer	

MOTORS AND CONTROL—There is a General Electric motor for every farm purpose and a General Electric switch or device to control it conveniently. To select the motor to serve most economically in any application General Electric engineers are glad to investigate individual problems and advise. General Electric motors are sold through G-E motor dealers in hundreds of towns and cities.

PUMP MOTORS—Many manufacturers of large pumps furnish G-E motors as a standard part of their equipment. Other manufacturers will in most cases be glad to furnish a G-E motor if instructed by the farmer.

 A Guarantee of Excellence on Goods Electrical 

Further Information

If you are interested in any particular use of electricity described in the G-E Farm Book and desire further information, General Electric Company will be glad to help you. There may be a G-E representative within a few miles of your farm, competent to assist you in selecting electrical equipment. A complete list of General Electric offices is given on the following page. Address the office nearest you.

GENERAL ELECTRIC COMPANY

GENERAL OFFICE: SCHENECTADY, N. Y.

SALES OFFICES (Address nearest Office)

Akron, Ohio.....	159 South Main Street	Los Angeles, Cal.....	724 South Spring Street
Atlanta, Ga.....	123 Spring Street	Louisville, Ky.....	455 South Fourth Street
Baltimore, Md.....	39 W. Lexington Street	Memphis, Tenn.....	130 Madison Avenue
Birmingham, Ala.....	2000 First Avenue	Milwaukee, Wis.....	217 Sycamore Street
Bluefield, W. Va.....	104 Federal Street	Minneapolis, Minn.....	410 Third Avenue, North
Boston, Mass.....	84 State Street	Nashville, Tenn.....	234 Third Avenue, North
Buffalo, N. Y.....	39 East Genesee Street	Newark, N. J.....	671 Broad Street
Butte, Mont.....	40 East Broadway	New Haven, Conn.....	129 Church Street
Canton, Ohio.....	700 Tuscarawas Street	New Orleans, La.....	921 Canal Street
Charleston, W. Va.....	201 Capitol Street	New York, N. Y.....	120 Broadway
Charlotte, N. C.....	200 South Tryon Street	Niagara Falls, N. Y.....	201 Falls Street
Chattanooga, Tenn.....	536 Market Street	Oklahoma City, Okla.....	1 West Grande Avenue
Chicago, Ill.....	230 South Clark Street	Omaha, Neb.....	401 South 16th Street
Cincinnati, Ohio.....	632 Vine Street	Philadelphia, Pa.....	1321 Walnut Street
Cleveland, Ohio.....	925 Euclid Avenue	Pittsburgh, Pa.....	529 Smithfield Street
Columbus, Ohio.....	81 East State Street	Portland, Ore.....	329 Adler Street
Dallas, Tex.....	1801 North Lamar Street	Providence, R. I.....	76 Westminster Street
Davenport, Iowa.....	Putnam Building	Richmond, Va.....	700 East Franklin Street
Dayton, Ohio.....	25 North Main Street	Rochester, N. Y.....	130 Main Street, East
Denver, Colo.....	809 17th Street	St. Louis, Mo.....	112 North 4th Street
Des Moines, Iowa.....	904 West Walnut Street	Salt Lake City, Utah.....	10 Exchange Place
Detroit, Mich.....	701 Griswold Street	San Antonio, Tex.....	City National Bank Bldg.
Duluth, Minn.....	14 West Superior Street	San Francisco, Cal.....	116 New Montgomery Street
Elmira, N. Y.....	342 East Water Street	Seattle, Wash.....	811 First Avenue
El Paso, Tex.....	206 San Francisco Street	Spokane, Wash.....	425 Riverside Avenue
Erie, Pa.....	10 East Twelfth Street	Springfield, Mass.....	387 Main Street
Fort Wayne, Ind.....	1635 Broadway	Syracuse, N. Y.....	113 South Salina Street
Grand Rapids, Mich.....	201 Monroe Avenue	Tacoma, Wash.....	950 Pacific Avenue
Greenville, S. C.....	119 South Main Street	Terre Haute, Ind.....	701 Wabash Avenue
Hartford, Conn.....	18 Asylum Street	Toledo, Ohio.....	520 Madison Avenue
Houston, Tex.....	5 North Milam Street	Trenton, N. J.....	45 East State Street
Indianapolis, Ind.....	106 North Illinois Street	Tulsa, Okla.....	403 Cosden Building
Jackson, Mich.....	308 Francis Street	Utica, N. Y.....	239 Genesee Street
Jacksonville, Fla.....	108 West Forsyth Street	Washington, D. C.....	1405 G Street, N. W.
Kansas City, Mo.....	1004 Baltimore Avenue	Waterbury, Conn.....	195 Grand Street
Knoxville, Tenn.....	602 South Gay Street	Worcester, Mass.....	340 Main Street
Little Rock, Ark.....	223 West 2nd Street	Youngstown, Ohio.....	44 Central Square

For Hawaiian business refer to W. A. Ramsay, Ltd., Honolulu

Motor Dealers and Lamp Agencies in all large cities and towns

SERVICE SHOPS

Atlanta.....	18 Stewart Avenue	Minneapolis.....	410 Third Avenue, N.
Chicago.....	509 E. Illinois Street	New York.....	627 Greenwich Street
Dallas.....	1801 No. Lamar Street	Oakland.....	5441 E. 14th Street
Erie.....	East Lake Road	Philadelphia.....	1223 Washington Avenue
Kansas City.....	19 Campbell Street	Schenectady, N. Y.....	1 River Road
Los Angeles.....	1719 No. Spring Street	Seattle.....	1508 Fourth Ave., S.
St. Louis.....	1007-1009 Spruce Street		

Distributors for the General Electric Company outside the United States

INTERNATIONAL GENERAL ELECTRIC COMPANY, INC.

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120 Broadway

General Sales Offices
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U. S. A.

London
Crown House,
Alldwych, W. C. 2

